

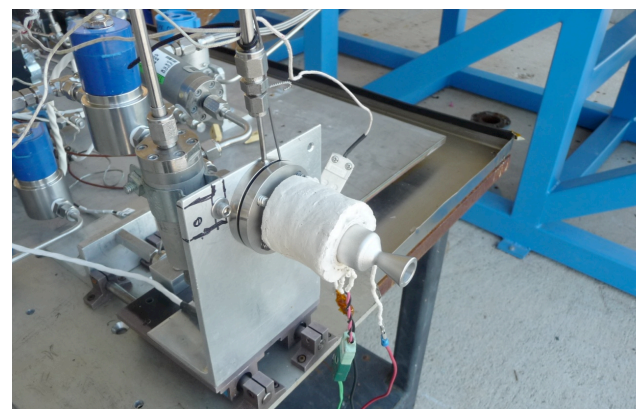


NASA SBIR/STTR Technologies
Non-Toxic HAN Monopropellant Propulsion
PI: Tim McKechnie/Plasma Processes, LLC-Huntsville, AL
Phase 1 Contract: NNX11CE41P

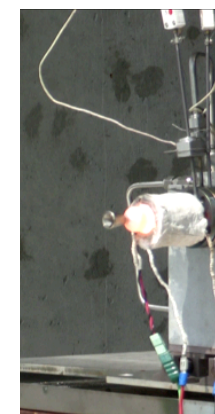


Identification and Significance of Innovation

- Most In Space chemical propulsion systems use hydrazine propellant. Hydrazine is highly toxic & dangerously unstable.
- Non-toxic HydroxylAmmonium Nitrate (HAN) AF-M315E monopropellant has 12% higher Isp and 60% higher density-Isp than hydrazine monopropellant.
- HAN's combustion temperature is significantly higher at 2083°K.
- New combustion chambers and catalysts that can tolerate the higher combustion temperature are needed.



4lbf Phase 1 Thrust Chamber
for AF-M315E Monopropellant



10 sec
firing

Phase I Accomplishments

- 4 lbf iridium/rhenium thruster was designed and manufactured for non-toxic AF-M315E monopropellant.
- A new metal foam based monolithic catalyst was developed and fabricated.
- Ignition of AF-M315E monopropellant was demonstrated.
- The thruster was successfully tested for 50 millisecond and 1 second pulses and then a 10 second burn.
- There was no degradation of thruster after testing in air.
- A “green” non-toxic monopropellant alternative to hydrazine was demonstrated.

NASA and Non-NASA Applications

- Mono-propellant and Bi-propellant rocket engines
- Reaction Control Systems
- Apogee Engines
- Mars Ascent Vehicle, Lunar lander

SBIR Industrial Partners: Dynetics, Aerojet, AMPAC ISP

Firm Contacts

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NON-PROPRIETARY DATA